

NOISE REDUCTION FOR SPECTROSCOPIC SIGNAL PROCESSING

ABSTRACT OF THE DISCLOSURE

A windowed noise reduction technique is presented that allows a noise-reduced spectrum of satisfactory accuracy to be recovered from original noisy spectroscopic data, while acquiring a significantly reduced number of transient acquisitions. The signal-averaged, decimated signal is written as a sum of a noise-free component and a noise component, and a vector space that contains a noise-free subspace and a noise subspace is created using these decimated signals. A correlation matrix is constructed in this vector space, and diagonalized to yield the singular values. The appearance of a clear gap between the noise-free singular values and the noise singular values, in a singular value graph, and the stability of the gap, supplies the criteria for determining that a sufficient number of iterations has been performed.